Remote Programmable
Linear Regulated Power Supply
User Manual

INSTRUCTION MANUAL

90W Micro-controller Based DC Power Supply

NDP - 4185 / 4303 / 4601

(USB / RS-485 Interface)

11/2004 Rev.1.1
7673-4185-0001

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1 INTRODUCTION

This unit is a high quality Micro-controller Based DC power supply with a total 90W output power. By using a digital operation control and an analogue output control, the unit combines the advantages of ease and accuracy of digital control with the clean analogue DC supply.

USB 1.1 and RS-485 interface are standard and supplied with software to be used with Windows™ operating systems.
By using the RS-485 interface, one PC can do remote control and data logging as many as 31 power supplies.
RS-232 interface is an optional replacement for USB 1.1 as alternatives.

In order to gain the greatest benefit from this power supply it is imperative that you read the instruction manual in full before operating the unit.

2 PRECAUTIONS FOR USE

2.1 CONFIRMING THE SUPPLY RANGE

The units must be used within its specified range. The rated input voltage can be found on the rating label under the unit. Before plugging into the AC supply outlet, check whether the input rating conform with your local supply . For certain models, a voltage selector is available, please switch the voltage selector to the appropriate position before use.

2.2 OPERATING ENVIRONMENT

- Because to use this unit within the specified ambient temperature range listed in the specification table.
- Because the unit is cooled by natural convection, do not place objects on top to block the convection. Also, user must not to place the unit on or rear any heat emitting devices or use multiple units in stacked configuration. For best result, use the unit in an environment that is as well cross-ventilated as possible.
- At 1KV of fast transient burst environment, the captioned model may have trouble in operation and require user reset.
- At 3V/m radiated immunity environment, the voltmeter may take a reading error +/-2V max. of the captioned model and back to normal operation without the interference.
- Altitude up to 2000M
- Installation category : CAT **II**
- pollution degree : 2
- Indoor use only

⚠ **Warning : For model NDP-4601 , the maximum output voltage is up to 60Vdc. If touch live metal part of output terminal. It may be to cause hazardous. User must avoid to touch live metal part of output terminal.**

3 SPECIFICATIONS OF NDP POWER SUPPLIES

Specifications

Models	NDP-4185	NDP-4303	NDP-4601
Output Voltage:	0-18VDC	0-30VDC	0-60VDC
Output Current:	0-5A	0-3A	0-1.5A
Output Power:	90W		
Ripple & Noise (rms):	3mV		
Load Regulation (voltage):	5mV	4mV	4mV
Line Regulation (voltage):	3mV		
Load Regulation (current):	5mA	4mA	4mA
Line Regulation (current):	2mA		
Input Voltage:	230Vac, 50Hz		
Power Consumption:	Approx. 220VA/W		
Display Meter:	4 digits - Display LED Ammeter and Voltmeter		
Meter's Accuracy:	± 0.1 % + 2 counts		
Indicators:	Constant Current and Constant Voltage LED Indicators		
Cooling System:	Natural Convection		
Operating Temperature:	5- 40ºC		
Protection:	-Tracking OVP (Over Voltage Protection), -Current Limiting, -Over Temperature Protection.		
Approvals:	CE EMC -- EN 55011, CE LVD -- EN 61010		
Dimension (WxHxD):	205x115x275 (mm)		
Weight:	Approx. 5kg		
Accessory:	-User Manual, -32-bit Windows® Control Software for Windows® 98/98SE/ME/2000/XP, LabView® Driver, Command Set, USB 1.1 Driver, USB Cable, RS485 Connector and one 120ohms Resistor.		
Optional Accessory:	RS232-to-RS485 Adapter ATR-2485		
Remarks:	-Adjustable Upper Voltage Limit,		

Remote Programming Specifications

Communication Interface:	USB 1.1 (Single Power Supply) and RS-485 (up to 31 Power Supplies)
Remote Programming Functionality:	Full control of power supply functions and data read-back
Data Logging:	Yes, with supplied software
Baud Rate:	9600bps

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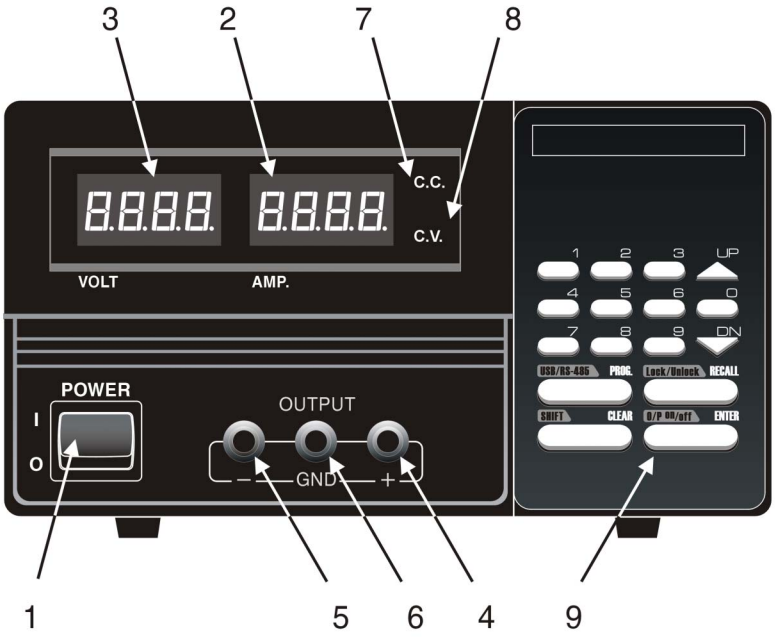
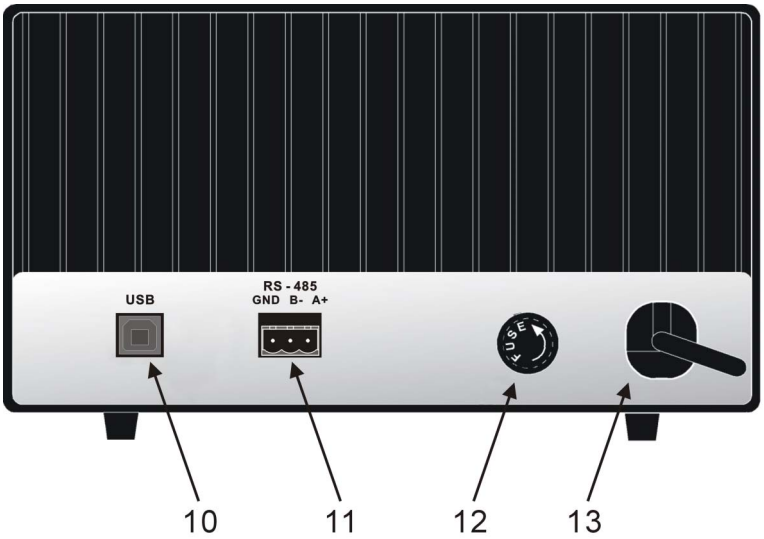
4 CONTROLS AND INDICATORS





1. **POWER SWITCH.** Turns power supply ON or OFF.
2. **AMMETER DISPLAY.** Indicates output current.
3. **VOLTMETER DISPLAY.** Indicates output voltage.
4. **OUTPUT "+" TERMINAL (RED).** Positive polarity output terminal.
5. **OUTPUT "-" TERMINAL (BLACK).** Negative polarity output terminal.
6. **GROUND "GND" TERMINAL (GREEN).** Ground terminal connected to chassis.
7. **CC DISPLAY.** Indicates the unit is in constant current mode.
   (Minute indicator in Timed Programming)
8. **CV DISPLAY.** Indicates the unit is in constant voltage mode.
   (Second indicator in Timed Programming)
9. **KEYPAD.**
10. **USB Interface.**
11. **RS-485 Interface**
12. **FUSE.**
13. **MAINS CABLE.**

5 OPERATING INSTRUCTIONS

5.1 General Operation Principle

This section contains a condensed overview of the unit.
Read this section to quickly get started.

5.1.1 Getting Started with Keypad Functions

The front Keypad is organized and summarized as follow:
(1) Number Keys & UP/DOWN Keys
(2) 4 Dual Function Control Keys

Keypad	Function	Section
Number Keys & UP/DOWN Keys		
0 thru 9	Press to select numerical values	
UP	Press to ascend the numerical values	
DN	Press to descend the numerical values	
Dual Function Control Keys		
SHIFT	Press to access alternate function of the control keys	
CLEAR	Press to terminate any input process and the unit will exit to normal operation	
PROG. 0 thru 9	Press to use programming features. Use 0 to specify the timed program Use 1 thru 9 to specify the location of preset program to be stored Use ENTER to confirm	 5.4.3 5.4.2
SHIFT USB/RS-485	Press to enter the PC interface selection menu. You can choose either USB or RS-485 Use USB/RS-485 ENTER to select USB or RS-485 Use ENTER to confirm the settings	5.3.3
RECALL 0 thru 9	Press to recall your stored preset or timed program Use 0 to recall the timed program Use 1 thru 9 to specify the location of preset program to recall Use ENTER to confirm	 5.4.3 5.4.3
ENTER	Press to confirm the new settings	
SHIFT Lock/Unlock	Press to Lock/Unlock the Keypad	5.3.2
SHIFT O/P ON/off	Press to Enable/Disable the output	5.3.1
Special Function		
SHIFT 0	Press to access the Upper Voltage Limit Setting Use 0 thru 9 to input the numerical values Use ENTER to confirm	 5.3.4

5.1.2 The Timed and Preset Programs

The unit can store 10 programs (program number 0-9).

Program 0 is reserved for storing 20 steps (timed subprograms).
Program 1 to 9 is for 9 sets of presets of voltage and current.
Please see Figure 5.1.2 for the structure.

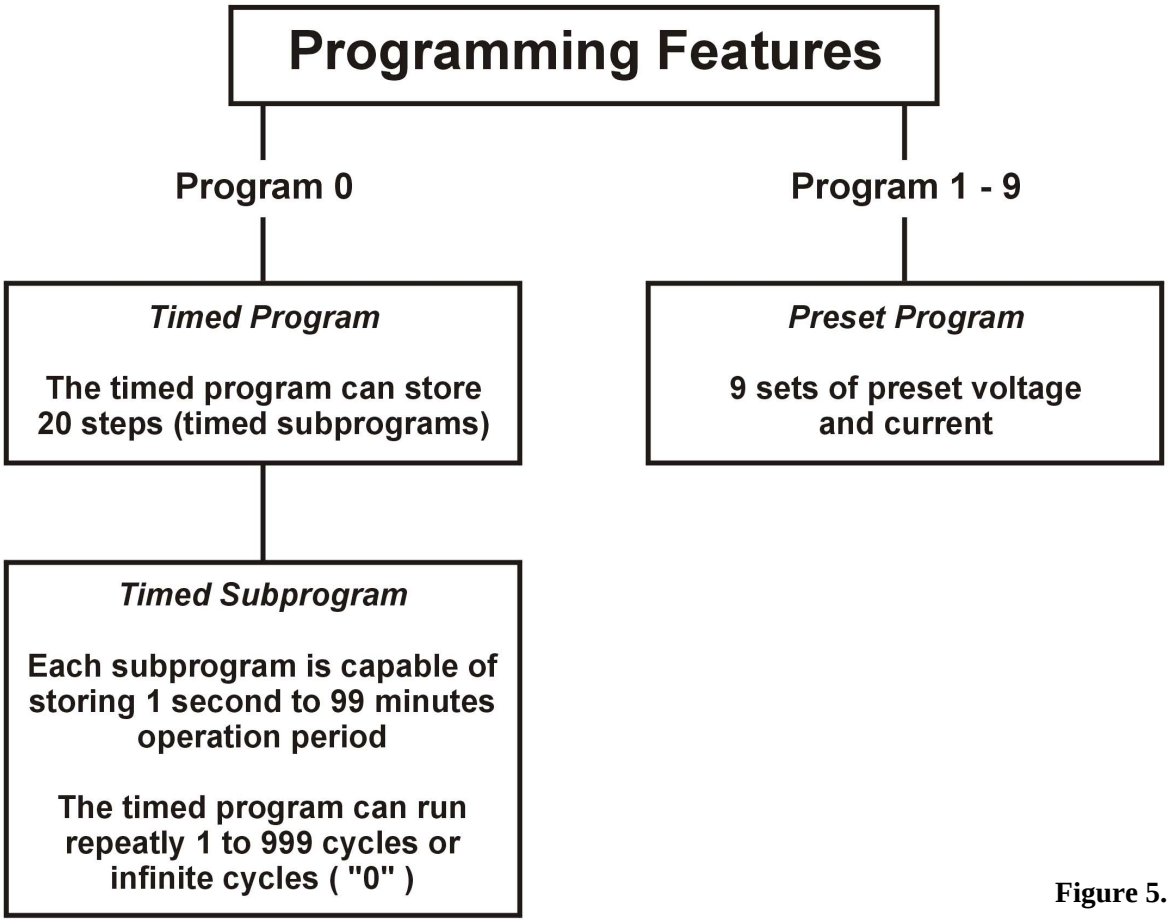

Programming Features
Program 0
Program 1 - 9
Timed Program
The timed program can store 20 steps (timed subprograms)
Preset Program
9 sets of preset voltage and current
Timed Subprogram
Each subprogram is capable of storing 1 second to 99 minutes operation period
The timed program can run repeatly 1 to 999 cycles or infinite cycles ("0")

Figure 5.1.2

5.2 Standard Operation Mode

After switching on the unit, prior to any power being delivered, the unit will go through its start-up self-diagnostic routine. As the unit carries out its diagnostic routine you will see both displays count from zero to nine.

The unit will now be in standard operation mode and will resume the voltage and ampere settings to those during previous power down.

WARNING !

For the above reason do not connect any equipment to the unit if you have any doubt as to what its settings were at previous power down.

The unit will always maintain either the maximum set voltage or current within its capability. During operation either the C.V. or C.C. indicator will be illuminated. These indicate whether the unit is running in constant voltage or constant current mode respectively.

This unit has a built in O.V.P (over voltage protection) feature. In the event of the voltage becoming significantly greater than the Upper Voltage Limit, the O.V.P. will be triggered. In this instance power delivery will be cut and a warning will be displayed. When you get this warning, switch the unit off and remove all loadings.
If you then switch the unit back on it should resume normal operation.
In the event this problem persists, the unit must be returned to the agent for further investigation.

5.3 Setting of Operation Modes

5.3.1 Output On/Off Mode

1. Press ***SHIFT*** key.
   The display will show **.... ....**
2. Press (O/P On/Off) key within 3 seconds.
3. If the display shows " OUt OFF ". the output is *OFF*.
   Otherwise, the output is *ON*. The output voltage and current readings are shown on the LED Display

5.3.2 Lock/Unlock the keypad

1. Press ***SHIFT*** key.
   The display will show **.... ....**
2. Press ***Lock/Unlock*** key within 3 seconds.
3. Press any number keypad and "Loc " will appear on the display.
   This confirms keypad is locked otherwise repeat the above procedures

5.3.3 PC Interface USB/RS-485

1. Press ***SHIFT*** key.
   The display will show **.... ....**
2. Press ***USB/485*** key within 3 seconds.
3. Select desired PC Interface by pressing the **UP** or **DN** Key.
4. For USB, press ***ENTER*** to confirm setting.
5. For RS-485, enter 485 address followed by ***ENTER*** to confirm setting.

5.3.4 Upper Voltage Limit Setting

This feature limits the upper level setting of output voltage to prevent inadvertent setting of high output voltage which may damage your equipment.
The value of this upper voltage range limit will be retained until further reset.

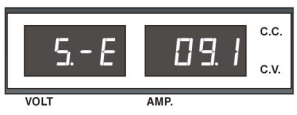
1. Press ***SHIFT*** and follow by ***0*** key.
2. The UP-L will appear in the display and enter your desired setting.
3. Enter your desired setting and press ***ENTER*** to confirm setting.
4. Recheck setting by repeating 1.

5.4 Manual Operation Mode

In manual operation mode, once the voltage and current have been set, the unit will maintain these settings until reprogrammed.
There are two ways of setting up the unit in standard operation mode, either by manual operation or use of the pre-set setting feature. Both methods are described below:-

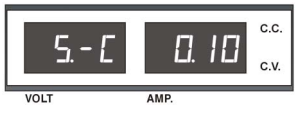
5.4.1 Setting Voltage and Current by Manual Operation

1. **Press 'ENTER' key**
   The left-hand display will show 'S-E' (i.e. set voltage) and the present voltage setting will be shown in the right-hand display.
   Set voltage to required level using either the number or up and down keys (If you enter a voltage outside the unit's capability, an error message will be displayed followed by the maximum allowable voltage of the unit. You must re-enter the voltage).



2. **Press 'ENTER' key**
   The left-hand display will show 'S-C ' (i.e. set current) and the present

   current setting will be shown in the right-hand display.
   Set the required current level using the keypad (If you enter a current level larger than the units capability, an error message will appear followed by the maximum allowable current of the unit. You must re-enter the required current)



3. **Press 'ENTER' and the unit will immediately assume inputted settings.**
   The unit will now maintain these settings until it is in some way reprogrammed.

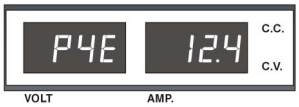
5.4.2 Using the Pre-set Feature

The unit has the ability to store nine pre-programmed voltage and current settings. Once programmed these settings will be stored by the unit even when switched off.

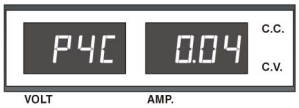
PRE-SET PROGRAMMING

1. **Press 'PROG.' key**
   The display will show '**P-**'. Input the location of the pre-set (1 to 9) you wish to program.

2. **The display will now show 'P.' followed by the pre-set location you chose and 'E.'** (i.e. program pre-set voltage).
   Using the keypad set your required voltage then press 'ENTER'.



3. **The display will now show 'P.', pre-set number, 'C.'** (i.e. program pre-set current).
   Set the required current level followed by the 'ENTER' key.



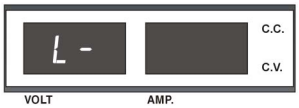
4. **The unit will now ask you to set the next pre-set, i.e. 'P', next pre-set, 'E'.**
   If you do not wish to change these settings press the 'ENTER' key and the unit will retain the current value and advance to the next stage.

   If you go through the above, up to the ninth pre-set, when you press 'ENTER', the pre-sets have now been successfully programmed.

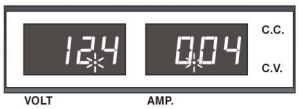
Whenever you want to terminate programming you can press the 'CLEAR' key to return to normal operation mode. The programmed value for the preceding locations will be retained.

SELECTING PRE-SETS

1. **Press 'RECALL' key**
   The left-hand display will show 'L -'.



2. **Input the pre-set location you wish to use**.
   The unit will now display the setting for the chosen pre-set and both decimal places will flash.



3. **Press 'ENTER**'
   The unit will immediately assume the chosen pre-set settings.

If during any of the above procedures you fail to input a setting within approximately ten seconds, the unit will cancel that procedure and resume its previous settings.
You can exit any of the above operations by pressing the 'CLEAR' key and the unit will assume its previous setting.

In Manual Operation mode the voltage and current can be adjusted using the UP and DN keys within the units limits at constant voltage mode (C.V.) and constant current mode (C.C.) respectively.

5.4.3 Using the Timed Programming

In the programmable mode the unit can be set to change the voltage and current settings for up to ten pre-set time periods.
Once in the program mode, the unit will loop through the programmed settings for the previously entered cycles unless interrupted by pressing 'CLEAR'.

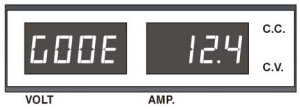
PROGRAMMING THE UNIT

This unit can be programmed to operate up to 20 timed subprograms (00 to 19).
In the event you require to run 0 to 5 subprograms in the cycle, only set as 0 - 5 subprograms.
After which, set the time for the remaining subprogram to zero. Any subprogram with a time frame of zero will effectively not exist.

Note – When the unit reaches an subprogram with a time frame of zero, it will return to the first subprogram(00).
For example if you set the subprogram 7 with zero time period, all the subprograms after 7 (i.e. 8,9,10) become non-existed.

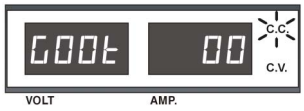
1. **Press the 'PROG.' key followed by '0'.**

2. **The display will now show '** G00E **'** (i.e. set subprogram 0 voltage) and any previous pre-set voltage value.
   Set the voltage to the required value and press 'ENTER'.

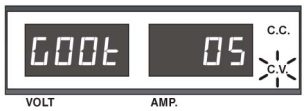


3. **The display will now show '** G00C **'** (i.e. set subprogram 0 current) and the previously programmed value.
   Set the current level and press 'ENTER'.

4. **The display will now show '** G00t **'** (i.e. set subprogram 0 time period) and the 'C.C.' will illuminate to indicate minutes.
   Set the number of whole minutes you require (up to a maximum of 99) and press 'ENTER'.



5. **The display will remain as before, however, the 'C.V.' will illuminate to indicate seconds.**
   Set the number of seconds you require (up to a maximum of 59) in addition to the previously set minutes and press 'ENTER'.



6. **The left-hand display will now show** "G01E" (i.e. set subprogram 1 voltage).
   You must now repeat steps **2** to **5** for all 9 remaining subprograms.

7. **After you have pressed 'ENTER', after setting the seconds for the twentieth address (No. 19), t**he unit has now been successfully programmed and will return to standard operation mode.

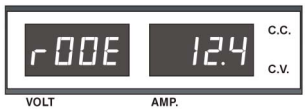
   NOTE : Please be aware that the life of the relay will limit the life of the power supply which is 100 X 10 operations as stated by the manufacturer.

RUNNING THE TIMED PROGRAM CYCLES

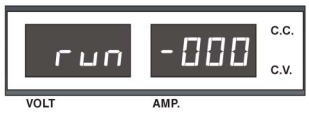
Once all the subprograms have been filled, as explained in the previous section, to recall the program:

1. **Press 'RECALL' followed by the '0' key.**

   The display will show '**r00E**' (recalled subprogram 0 voltage) with the corresponding value for subprogram 0.
   Using the up and down keys you are now able to move up and down to check all four values for all ten subprograms.



2. **Once you are satisfied that all the subprograms are correct, press 'ENTER'.**
   The display will show '**run**' and '**-000**'.
   Using the up and down keys set the number of cycles you require (0-999, 0 being infinity).



3. **Once the number of cycles is set press 'ENTER'.**
   The unit will run through the program starting with subprogram 0.

   You will know the unit is in running-in programmed mode as a dot on the extreme bottom right of the right hand display will flash.

   In order to exit the program, press the ***CLEAR*** button. The unit will resume in the standard operation mode. The voltage and current settings will be those of the address the unit was up to at the point of exit from the program.

   If during any of the above procedures you fail to input a setting within approximately ten seconds, the unit will cancel that procedure and assume its previous settings.

6 PC Interface Control User Manual

This section shows how to connect:
- single power supply via USB1.1 Interface
- 2 or above(up to 31) power supplies via RS-485 Interface

6.1 Connect a Single Power Supply to PC via USB1.1

The power supply can be connected to PC via USB1.1 as Figure 6.1a.
Please use the provided USB connection cable.

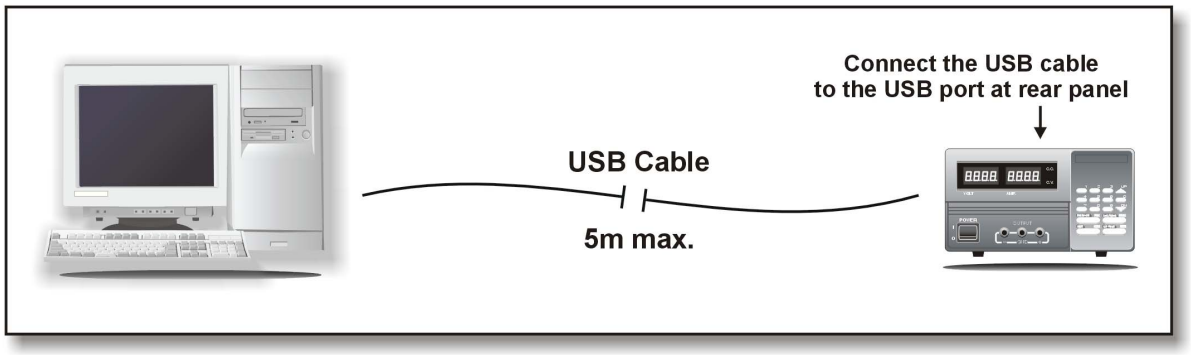


Figure 6.1a

6.2 Connect Multiple Power Supplies to PC via RS-485

For multiple power supplies, use the RS-485 Interface through the RS-485 port at rear panel of the power supply .
Up to 31 power supplies can be connected via RS-485.
You will need a RS-232 to RS-485 Adapter (optional accesssory) and the connection is as Fig. 6.2a & 6.2b.

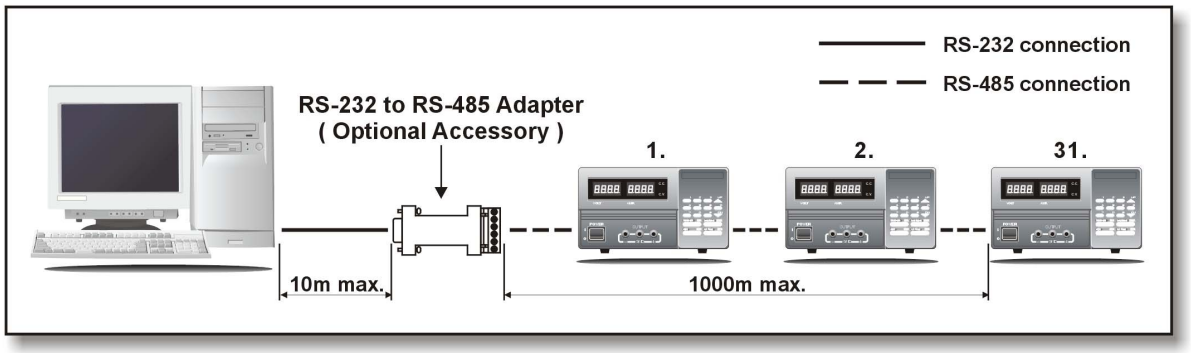


Figure 6.2a

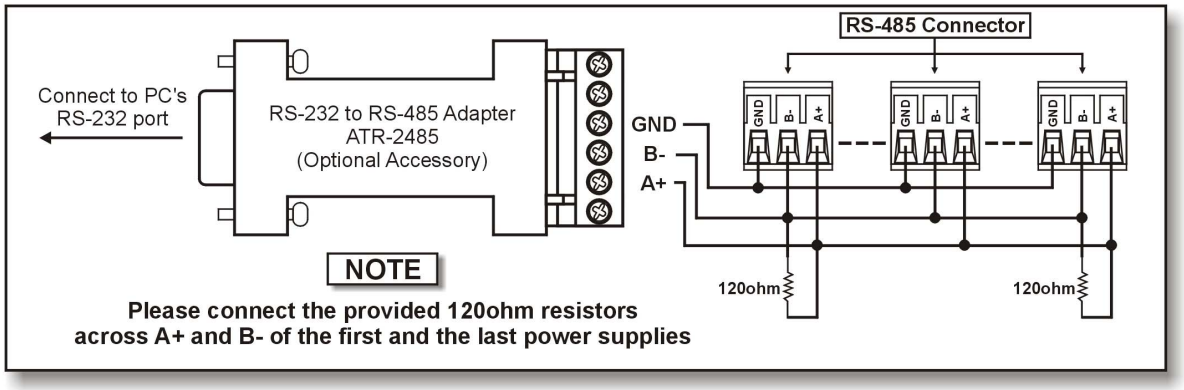


Figure 6.2b

6.3 PC Application Software

6.3.1 What the application software will do

The application software can perform:
- Timed Programming
- Preset Programming
- Data logging
- Voltage, current and Upper voltage limit setting

6.3.2 System Requirements

- CPU 450 Mhz or above
- 128 MB Ram
- Min. monitor screen resolution: 800 x 600 pixels.
- Operating systems: Windows® XP, ME, 2000, 98SE, 98

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6.3.3 Installation of software

1. Place the provided installation disc in your CD rom Drive and run setup.exe.

2. Follow the instructions in the setup program.

NOTE

During the running of the setup program, you may encounter "VERSION CONFLICT" remarks, ignore it and click "YES" to complete the installation.

3. A NDP icon is created in the Program Menu.

6.4 Running the Application Software for USB1.1 Interface

NOTE

Before running the application software, you must have installed and connected your power supply to the PC using the provided USB cable.

6.4.1 Getting Started with Software for USB 1.1 Interface

1. Ensure your PC is off ,connect USB cable to the USB plug of your PC and the power supply.
2. Press [**SHIFT]** then quickly followed by [**USB/RS-485]** key.
3. Use **[UP]** and **[DN]** key to select USB as shown in the LED and followed by **[ENTER]** key.
4. Switch on your PC and run the ***NDP*** program.
5. Click on Setup, and select the desired USB port. The default is USB port 1.

Figure 6.4.1a

6. Click on **Supply Connect**, then click on **Single** in the drop menu.
7. An “Internal Timed Program” window as shown in Figure 6.4.1b will appear.

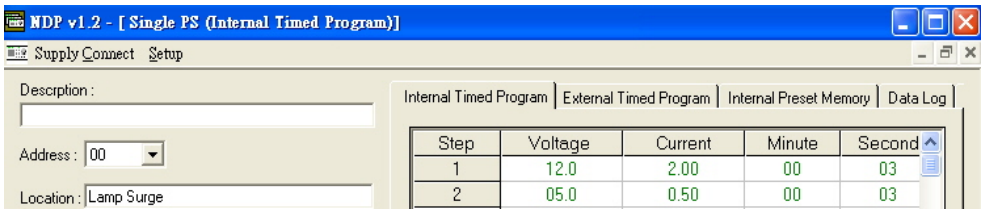


Figure 6.4.1b

8. When the right bottom corner of the display window shows the **UVL** value(see Figure. 6.4.1c), connection to the PC is made correctly and the power supply is operating normally.

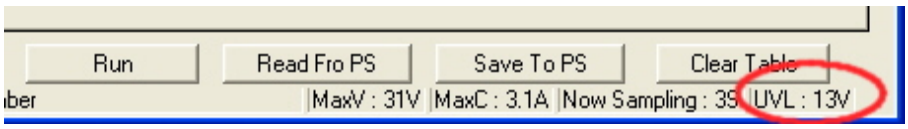


Figure. 6.4.1c

9. If it shows **No Connection** (see Figure 6.4d), check the following:

A. Go back to setup check if the correct USB/COM port has been assigned.
B. Check the Power Supply if USB has been selected.
C. Check the USB cable connections.
D. Check the power supply is ON.

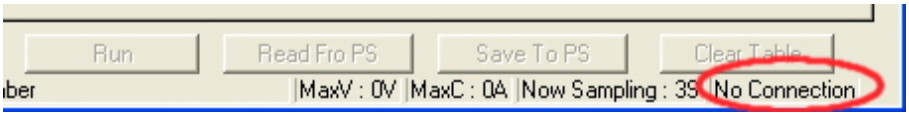


Figure. 6.4.1d

Remarks:

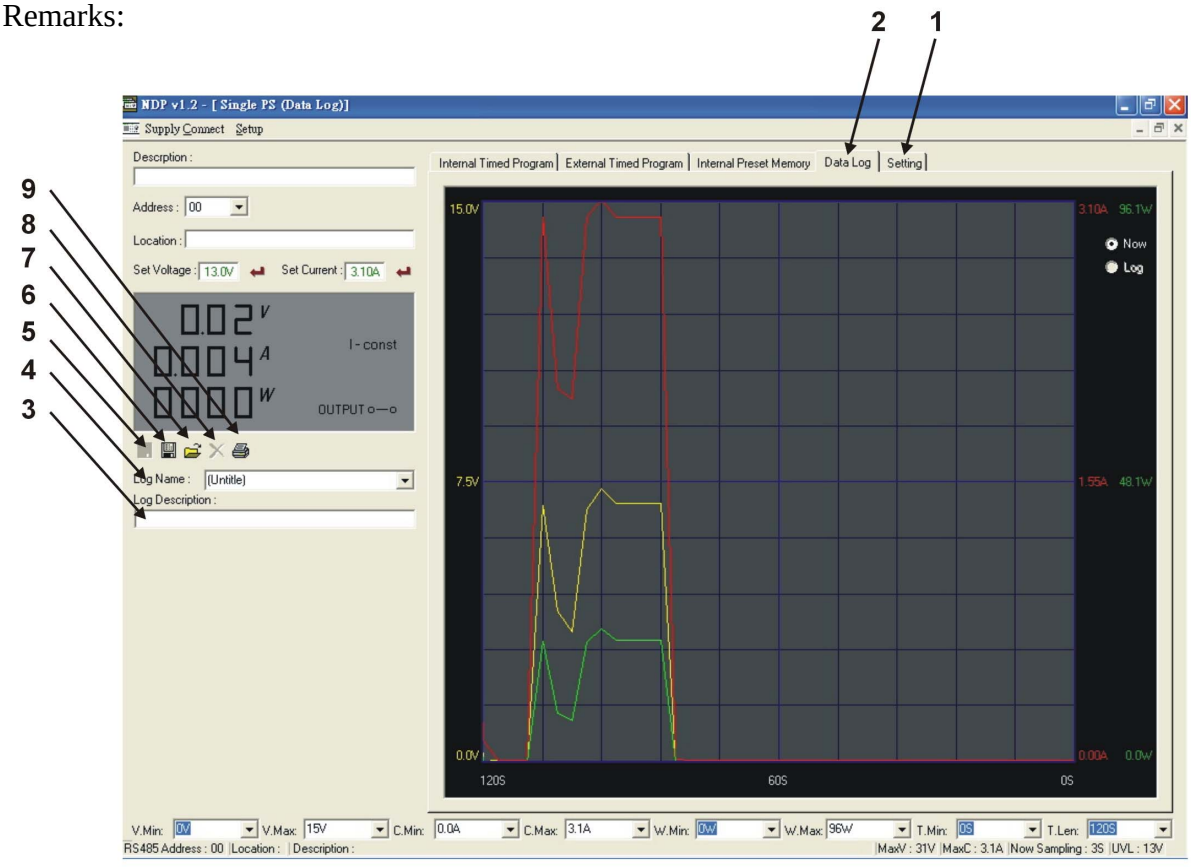


Figure. 6.4.1e

(1) **Setting** ------- one click , then the pop-up | Data Log Sampling Time |

You can input your desired sample time from 1 second up or select from the drop menu.

| Voltage Upper Limit Setting |

You can set your output voltage upper limit value to further safeguard your low voltage applications.

(2) Data Log window

A) You can use the Data Log window to view present output data or stored data.
B) All the parameters at the bottom of the window display can be changed by direct entry from the PC (with decimal point) and then confirm by the Enter key of the PC , or select the values from respective drop menu.

Parameters at the bottom of the Data Log window:

V Min. ------- Minimum voltage level.
V Max. ------- Maximum voltage level.
C Min. ------- Minimum current level.
C Max. ------- Maximum current level.
W Min. ------- Minimum power level in watt.
W Max. ------- Maximum power level in watt.

(3) Log Name ------- Untitle

Click cursor on “Untitle” , type in a name for your log.
Note how the ###(5) icon changes to solid color

(4) Log Description

You can type in your detail description of your log.

(5) ###Save Log

(a) This function (and the icon) becomes effective when a Log Name is entered to replace the “Untitle”.
(b) Click on it will save the current data onto the PC.
(c) To retrieve the data , go to the drop menu at (3) Log Description.

(6) ##### Export to a file of xls type

Click on this icon will export the collected data (in the Save Log) in xls format to your PC.

(7) XXX Delete

Click on this icon will delete the current log or retrieved log on display at (3).

(8) Print Log in xls format.

(9) Time minimum and Time Length

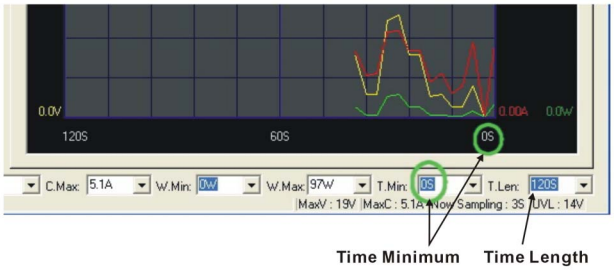


Figure. 6.4.1f
Bottom part of data log window

THE TIME FRAME CONCEPT OF DATA LOG

The data logging function starts when the software is started running.
When **T Min** is set to zero second, it means the unit is on real time and the length of time lapsed is on the left hand side of the Time Minimum.
T Len is the length of time lapsed starting from the Time Minimum.
Both parameters are adjustable so that any time period of the log can be displayed for analysis.
In the above example, T Min is set to 0 second and T length to 120 second, the display shows the output data starting at 0 second ago and ending at the 120 second mark.

6.4.2 General Operation

Please refer to Figure 6.4.2a for the following description.

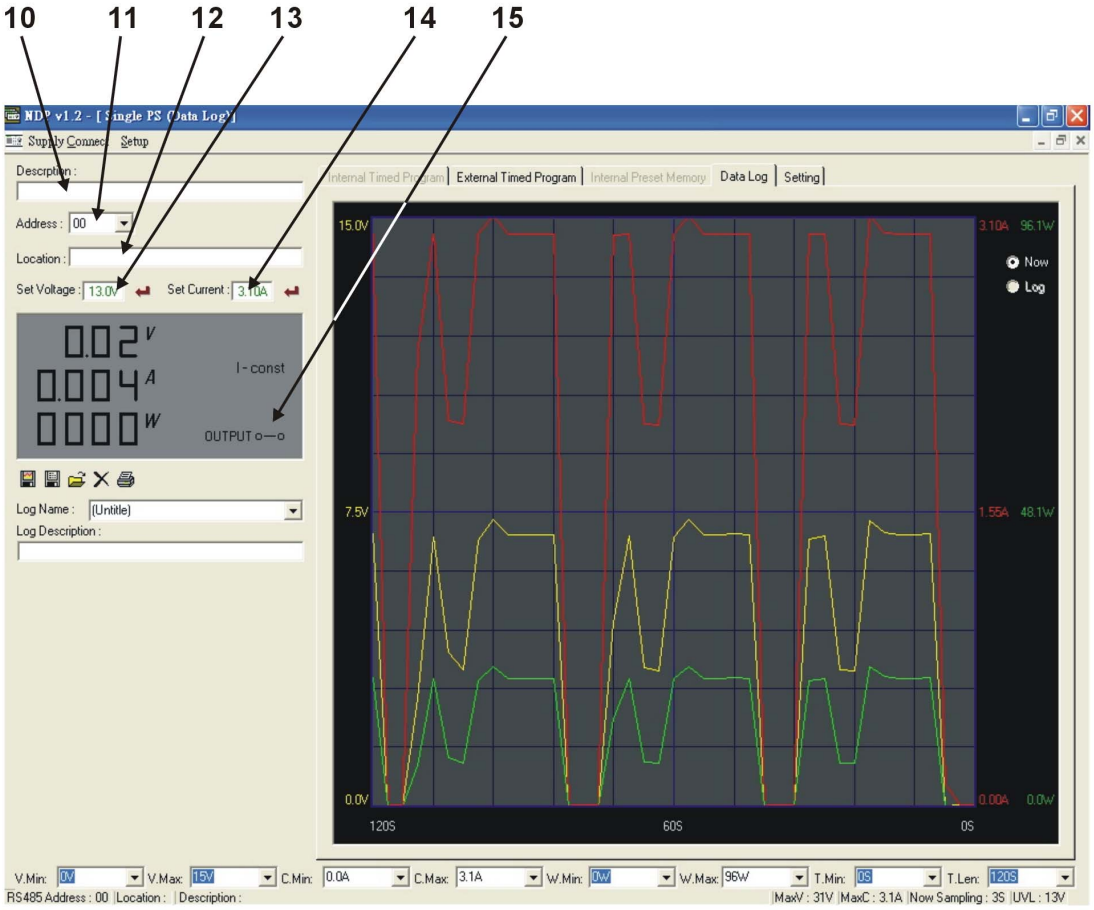


Figure 6.4.2a

(10) Power Supply Description:

Test00

You may click on and assign an Description for your power supply in use.
Actually this feature is mainly for multiple power supplies application with RS-485.

(11) Power Supply Address :

00 ▼

This function is for multiple power supplies application.
Each power supply has a unique address.
Ignore this function when using USB.

(12) Location:

Workshop 1

You may click on and assign an identification for your power supply in use.
Actually this feature is mainly for multiple power supplies application with RS-485.

(13) Voltage:

##.# V

Enter the desired output voltage with decimal point.

(14) Current:

Enter the desired current limit with decimal point.

(15) OUTPUT o------o

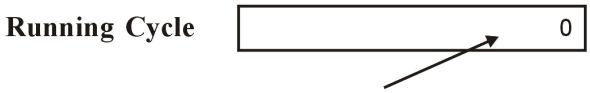
Left click on icon will switch on or off the output.

6.4.3 Internal Timed Program

The PC interface remote mode really eliminates the tedious process in keying in groups of entries on the power supply. Because all the data are displayed together in the monitor, possibility of wrong entry is greatly reduced. Data of different groups can be classified, stored, exported and retrieved for use at any time.
Furthermore, retrieved data will be in red color if they exceed the present preset limits of voltage in upper voltage level or current limiting value.

The operation principle of Saving, Exporting, Filing, Deleting and Printing are the same as the Data Log function.

Clear Table-------Delete all data on the Display Table to ready for new data entry.
Save to PS--------Transfer data from the Display Table to the Power Supply.
Read fro PS-------Get data from the Power Supply.
Run----------------To run the timed program.



Enter the number of desired running cycles here, **0 means infinity**.
You can enter up to 999 running cycles.

Note: The data must transfer to power supply before run.

6.4.4 External Timed Program

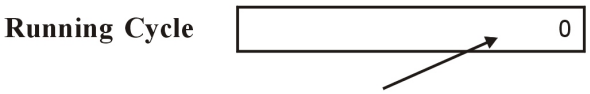
External Timed Program is different from the Internal Timed Program. External Timed Program is completely controlled by PC, PC counts the time and changes voltage and current of power supply. Internal Timed Program is using built-in function of the power supply.

Select External Timed Program tap to switch to the External Timed Program Page.
Select number of steps for the program: Enter the number of steps in the field of No. of Rows and press Enter (Maximum 100 Steps)

The operation principle of Saving, Exporting, Filing, Deleting and Printing are the same as the Data Log function.

Clear Table----------Delete all data on the Display Table to ready for new data entry.

Run----------To run the timed program.



Enter the number of desired running cycles here, **0 means infinity**.
You can enter up to 999 running cycles.

6.4.5 Internal Preset Memory

The operation principle is the same as Internal Timed Program.
To activate the selected preset click on the box of the option column then click Run.

6.5 Running the Software using RS-485 Interface

NOTE

Before running the application software, you must have installed and connected your power supplies to the PC via RS-485 as Figure 6.2a and 6.2b on page 9.

6.5.1 Getting Started with Software for RS-485 Interface

1. On your power supplies, press **[SHIFT]** key, then quickly press **[USB/RS-485]** key and select RS-485.
2. A 2-digit number will appear. This number is the address assigned to the power supply and will be used in the software.
3. Using the Key Pad to key in the address to assign for each power supply. The range is 00 ~ 30 and each of the power supplies requires an unique address.
4. Switch on your PC and run the ***NDP*** program.
5. Click on **Setup**, and select the desired Com. Port. The default is set at Com 1.
6. In the tool bar, Click on **Supply Connect**, then click on **Single** in the drop menu.
7. An Internal Timed Program window will appear.
8. By choosing the address in the **Address** field (Figure 6.5.1a) you can input the desired settings for each power supply as given in Section 6.2 on page 9.

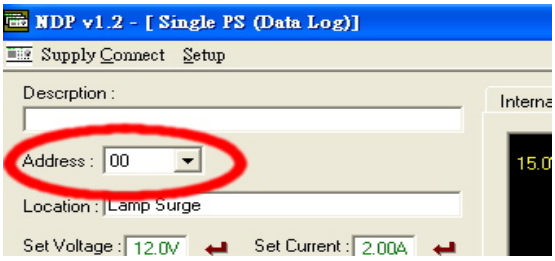


Figure 6.5.1a

6.5.2 Configuration of Multi Windows Analysis

1. In the tool bar, Click on **Supply Connect**, then click on **Multi** in the drop menu.
2. A *Multi Windows* (Figure. 6.5.1a) will appear.
3. Click on the icon (circled as below), a *Multi Power Supply Connect Setup* (Figure 6.5.1b) will appear.

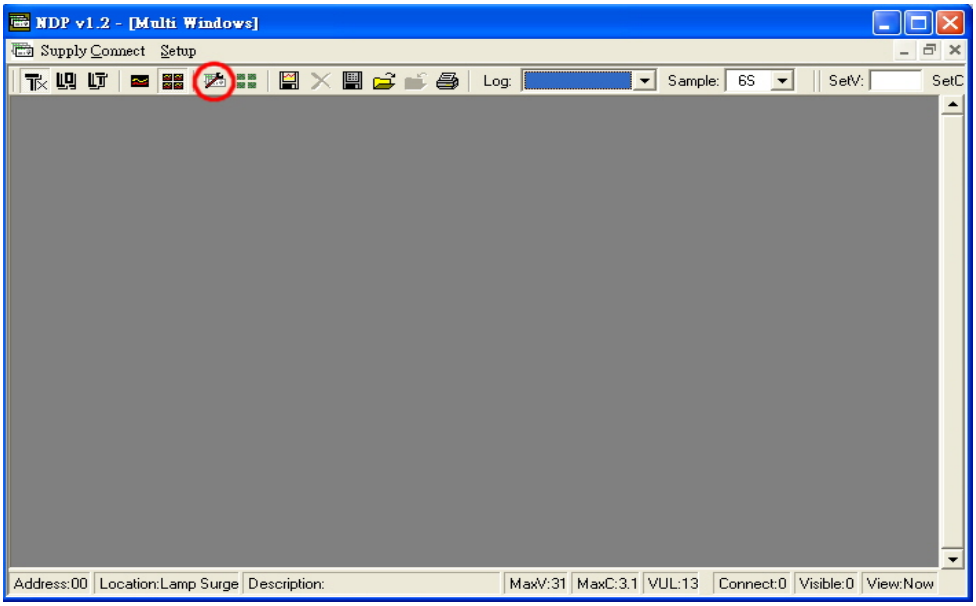


Figure . 6.5.2a

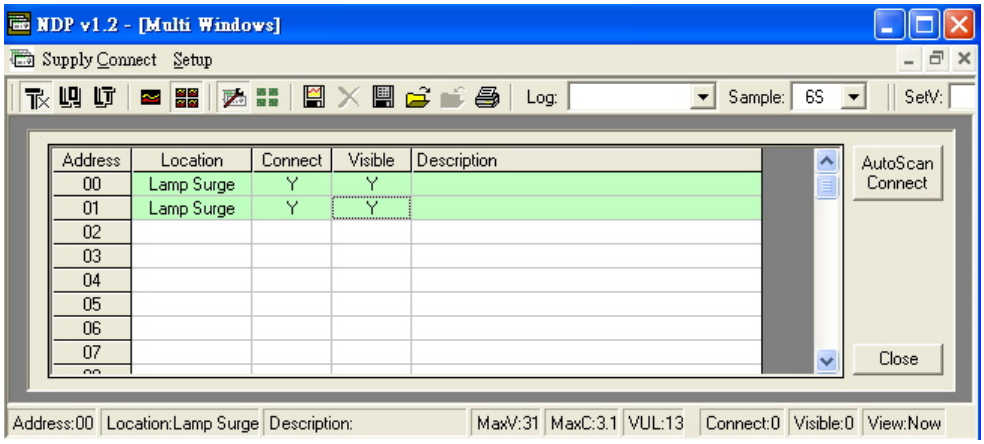


Figure . 6.5.2b

4. Click on **AutoScan Connect**, the window will show the connected power supply indicted as "Y".

5. Click on the box along the Visible Column to set the desired power supply to be visible in Multiple Data Log Window.
6. You can type in the description and location of your power supplies in the **Location** and **Description** Column.
7. Click on Close icon(at right bottom of window) to return to Multiple Data Log Window.

Remarks:

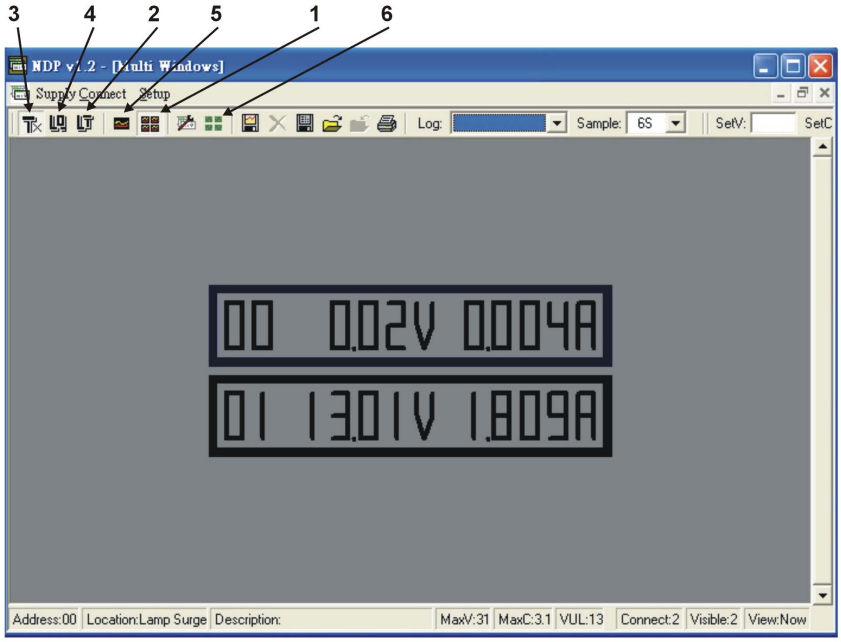


Figure 6.5.2c

(1) Multi Alleyway Display

One click, it will display the Data log and output data of all the power supplies.
It will activate the icon (2), (3) and (4).

(2) Show Digital and Log

One click, it will show both the data log of all the connected power supplies.

Figure. 6.5.2d

You can click on the data log to select the power supply, the data log will highlight in blue and the address bar in the left bottom window will show the selected power supply.

(3) Show Digital

One click, it will show the digital readings of all the connected power supplies.

(4) Show Log

One click, it will show the data log of all the connected power supplies.

(5) Single Alleyway Display

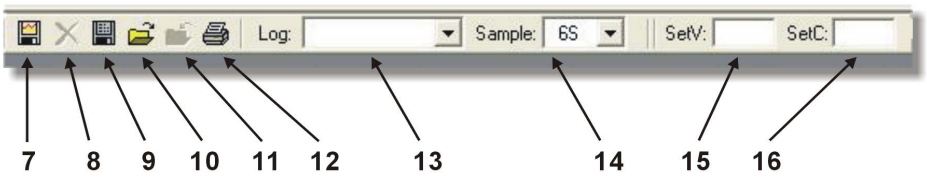
One click, it will only display the data log of the selected power supply(Figure 6.5.2d).
It will disable the icon (2), (3) and (4).

The parameters at the bottom are same as the Data Log Window in USB Interface(Page 12).

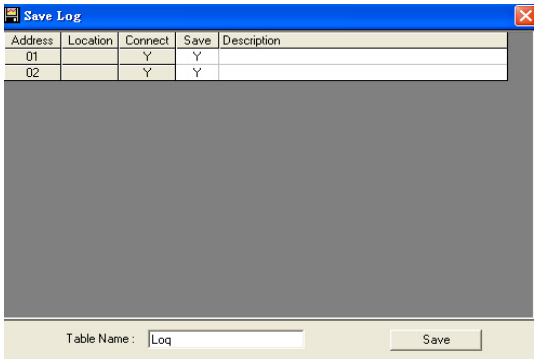
The All SP Tick box --- Tick to apply the parameters to all Data Log Window in Multi Alleyway Display.

(6) Log Thumbnails Size Setup

One click, it let user to adjust the window size of the *Data log Window* in *Multi Alleyway Display*.
Use the sliders to adjust the height and width of the Data Log Windows.
Scale 4:3 tick box can enable 4:3 screen size for the Data Log Windows



(Figure. 6.5.2e)

#	Icon	Description
(7)	**Save Log**	a) Click on it and a save log window(Fig.6.5.2f) will appear.  **(Fig.6.5.2f)** b) Click on the box along the Save column to choose the desired power supplies' data log to save. c) Type in the Table Name. d) Click Save will save the current data onto the PC. e) To retrieve data, go to the drop menu at Log (13).
(8)	**Delete Log**	It can delete the log data in the PC.
(9)	**Export to a file log of xls type**	Click on this icon will export the collected data (in Data Log) in xls format to your PC.
(10)	**Open File Log of xls type**	Click on this icon will import the collected data in xls fomat file to the NDP software.
(11)	**Close File Log of xls type**	Click on this icon will close the import xls format file.
(12)	**Print Log**	Print Log in xls format.
(13)	**Log**	Click on it to select the save log data.
(14)	**Sample**	Click on it to select the sampling time.
(15)	**SetV**	Click on it and type in to change the voltage setting of the selected power supply.
(16)	**SetC**	Click on it and type in to change the current setting of the selected power supply.

7 MAINTENANCE

WARNING !

This is a factory sealed unit and the only maintenance that can be carried out is described below.
You should under no circumstances remove any of the casing from the unit. In case that you encounter problems which cannot be solved using the methods described below then the whole unit must be returned to the agent.

7.1 Fuse Replacement

If the fuse blows, the unit will not operate. Under normal circumstances the fuse should not blow, hence if it does this may indicate some problem with the unit.
Before replacing the fuse, remove any loading from the unit and then only replace with a fuse of the correct rating.

7.2 Recalibration

This in-case recalibration is to reduce:

1. the difference between set value and the actual output value from the output terminal. (see section 7.3)
   Note: You only do section 7.3 when the difference is greater than 0.1V for voltage and 0.01A for current
2. the difference between set value and the LED Display value. (see section 7.4)
   Note: You only do section 7.4 when the difference is greater than 0.1V for voltage and 0.01A for current

7.3 Recalibrating the Set Value and the Actual Output Value

7.3.1 Calibrating Voltage

1. **Connect a voltmeter to the output terminals** (see fig. 1).

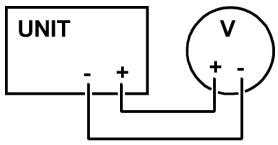


fig. 1

2. **Set the voltage and current value as follow:**

Model Number	NDP-4185	NDP-4303	NDP-4601
Set Voltage Value	9.0V	15.0V	30.0V
Set Current Value	2.50A	1.50A	0.75A

3. **Compare the voltmeter reading with the set voltage value.**
4. **Calculate : Difference = Set Value – Voltmeter reading.**
5. **Use the calculated difference to find the corresponding offset value on the look up table for voltage calibration in appendix A.**
6. **Press on the keypad in the sequence: "SHIFT" -> "3" -> "9".**
   This will gain you access to the calibration mode and the display will show ' CAL A-d '.
7. **Using the up and down keys to select (d-A) and press 'ENTER'.**
   This will gain you access to calibrate the difference between set value and the actual output value.
8. **The display will show " d-A ---E" and press "ENTER".**
9. **The display will show " Ad-E OFSt" and press "ENTER".**
10. **Key in the offset value you find on the look up table and press "ENTER".**
11. **If you press 'CANCEL' at any time during calibration you will jump out the calibration process and no change will be made to the memory.**

7.3.2 Calibrating Current

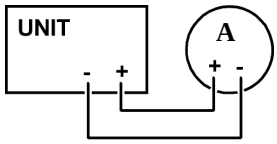


fig.2

1. **Prepare an ammeter and make sure it can measure up to 5A. Connect the ammeter to the unit(see fig. 2).**

2. **Set the voltage and current value as follow:**

Model Number	NDP-4185	NDP-4303	NDP-4601
Set Voltage Value	9.0V	15.0V	30.0V
Set Current Value	2.50A	1.50A	0.75A

3. **Compare the ammeter reading with the set current value.**

4. **Calculate : Difference = Set Value – ammeter reading.**

5. **Use the calculated difference to find the corresponding offset value on the look up table for current calibration in appendix B.**

6. **Press on the keypad in the sequence: "SHIFT" -> "3" -> "9". This will gain you access to the calibration mode and the display will show 'CAL A-d'.**

7. **Using the up and down keys to select (d-A) and press 'ENTER'. This will gain you access to calibrate the difference between set value and the actual output value.**

8. **The display will show " d-A --C " and press "ENTER".**

9. **The display will show " Ad-E OFSt " and press "ENTER".**

10. **Key in the offset value you find on the look up table and press "ENTER".**

11. **If you press 'CANCEL' at any time during calibration you will jump out the calibration process and no change will be made to the memory.**

7.4 Recalibrating the Set Value and the LED Display Value

7.4.1 Calibrating Voltage

1. **Set the voltage and current value as follow:**

Model Number	NDP-4185	NDP-4303	NDP-4601
Set Voltage Value	9.0V	15.0V	30.0V
Set Current Value	2.50A	1.50A	0.75A

2. **Compare the voltmeter reading with the set voltage value.**

3. **Calculate : Difference = Set Value – Voltmeter reading.**

4. **Use the calculated difference to find the corresponding offset value on the look up table for voltage calibration in appendix A.**

5. **Press on the keypad in the sequence: "SHIFT" -> "3" -> "9". This will gain you access to the calibration mode and the display will show 'CAL A-d'.**

6. **Using the up and down keys to select (A-d) and press 'ENTER'. This will gain you access to calibrate the difference between set value and the actual output value.**

7. **The display will show " A-d ---E " and press "ENTER".**

8. **The display will show " Ad-E OFSt " and press "ENTER".**

9. **Key in the offset value you find on the look up table and press "ENTER".**
10. **If you press 'CANCEL' at any time during calibration you will jump out the calibration process and no change will be made to the memory.**

7.4.2 Calibrating Current

1. **Set the voltage and current value as follow:**

Model Number	NDP-4185	NDP-4303	NDP-4601
Set Voltage Value	9.0V	15.0V	30.0V
Set Current Value	2.50A	1.50A	0.75A

2. **Compare the ammeter reading with the set current value.**

3. **Calculate : Difference = Set Value – ammeter reading.**

4. **Use the calculated difference to find the corresponding offset value on the look up table for current calibration in appendix B.**

5. **Press on the keypad in the sequence: "SHIFT" -> "3" -> "9".**
   This will gain you access to the calibration mode and the display will show "CAL A-d" .

6. **Using the up and down keys to select (A-d) and press 'ENTER'.**
   This will gain you access to calibrate the difference between set value and the actual output value.

7. **The display will show "A-d ---C " and press "ENTER".**

8. **The display will show "Ad-E OFSt " and press "ENTER".**

9. **Key in the offset value you find on the look up table and press "ENTER".**

10. **If you press 'CANCEL' at any time during calibration you will jump out the calibration process and no change will be made to the memory.**

APPENDIX A

LOOK UP TABLE FOR VOLTAGE RECALIBRATION

Difference	Offset	Difference	Offset	Difference	Offset	Difference	Offset
+ 0.00	0 or 127	+ 0.33	33	+ 0.66	66	+ 0.99	99
+ 0.01	1	+ 0.34	34	+ 0.67	67	+ 1.00	100
+ 0.02	2	+ 0.35	35	+ 0.68	68	+ 1.01	101
+ 0.03	3	+ 0.36	36	+ 0.69	69	+ 1.02	102
+ 0.04	4	+ 0.37	37	+ 0.70	70	+ 1.03	103
+ 0.05	5	+ 0.38	38	+ 0.71	71	+ 1.04	104
+ 0.06	6	+ 0.39	39	+ 0.72	72	+ 1.05	105
+ 0.07	7	+ 0.40	40	+ 0.73	73	+ 1.06	106
+ 0.08	8	+ 0.41	41	+ 0.74	74	+ 1.07	107
+ 0.09	9	+ 0.42	42	+ 0.75	75	+ 1.08	108
+ 0.10	10	+ 0.43	43	+ 0.76	76	+ 1.09	109
+ 0.11	11	+ 0.44	44	+ 0.77	77	+ 1.10	110
+ 0.12	12	+ 0.45	45	+ 0.78	78	+ 1.11	111
+ 0.13	13	+ 0.46	46	+ 0.79	79	+ 1.12	112
+ 0.14	14	+ 0.47	47	+ 0.80	80	+ 1.13	113
+ 0.15	15	+ 0.48	48	+ 0.81	81	+ 1.14	114
+ 0.16	16	+ 0.49	49	+ 0.82	82	+ 1.15	115
+ 0.17	17	+ 0.50	50	+ 0.83	83	+ 1.16	116
+ 0.18	18	+ 0.51	51	+ 0.84	84	+ 1.17	117
+ 0.19	19	+ 0.52	52	+ 0.85	85	+ 1.18	118
+ 0.20	20	+ 0.53	53	+ 0.86	86	+ 1.19	119
+ 0.21	21	+ 0.54	54	+ 0.87	87	+ 1.20	120
+ 0.22	22	+ 0.55	55	+ 0.88	88	+ 1.21	121
+ 0.23	23	+ 0.56	56	+ 0.89	89	+ 1.22	122
+ 0.24	24	+ 0.57	57	+ 0.90	90	+ 1.23	123
+ 0.25	25	+ 0.58	58	+ 0.91	91	+ 1.24	124
+ 0.26	26	+ 0.59	59	+ 0.92	92	+ 1.25	125
+ 0.27	27	+ 0.60	60	+ 0.93	93	+ 1.26	126
+ 0.28	28	+ 0.61	61	+ 0.94	94	+ 1.27	127
+ 0.29	29	+ 0.62	62	+ 0.95	95		
+ 0.30	30	+ 0.63	63	+ 0.96	96		
+ 0.31	31	+ 0.64	64	+ 0.97	97		
+ 0.32	32	+ 0.65	65	+ 0.98	98		

APPENDIX A (Continue)

LOOK UP TABLE FOR VOLTAGE RECALIBRATION (Continue)

Difference	Offset	Difference	Offset	Difference	Offset	Difference	Offset
- 0.01	129	- 0.34	162	- 0.67	195	- 1.00	228
- 0.02	130	- 0.35	163	- 0.68	196	- 1.01	229
- 0.03	131	- 0.36	164	- 0.69	197	- 1.02	230
- 0.04	132	- 0.37	165	- 0.70	198	- 1.03	231
- 0.05	133	- 0.38	166	- 0.71	199	- 1.04	232
- 0.06	134	- 0.39	167	- 0.72	200	- 1.05	233
- 0.07	135	- 0.40	168	- 0.73	201	- 1.06	234
- 0.08	136	- 0.41	169	- 0.74	202	- 1.07	235
- 0.09	137	- 0.42	170	- 0.75	203	- 1.08	236
- 0.10	138	- 0.43	171	- 0.76	204	- 1.09	237
- 0.11	139	- 0.44	172	- 0.77	205	- 1.10	238
- 0.12	140	- 0.45	173	- 0.78	206	- 1.11	239
- 0.13	141	- 0.46	174	- 0.79	207	- 1.12	240
- 0.14	142	- 0.47	175	- 0.80	208	- 1.13	241
- 0.15	143	- 0.48	176	- 0.81	209	- 1.14	242
- 0.16	144	- 0.49	177	- 0.82	210	- 1.15	243
- 0.17	145	- 0.50	178	- 0.83	211	- 1.16	244
- 0.18	146	- 0.51	179	- 0.84	212	- 1.17	245
- 0.19	147	- 0.52	180	- 0.85	213	- 1.18	246
- 0.20	148	- 0.53	181	- 0.86	214	- 1.19	247
- 0.21	149	- 0.54	182	- 0.87	215	- 1.20	248
- 0.22	150	- 0.55	183	- 0.88	216	- 1.21	249
- 0.23	151	- 0.56	184	- 0.89	217	- 1.22	250
- 0.24	152	- 0.57	185	- 0.90	218	- 1.23	251
- 0.25	153	- 0.58	186	- 0.91	219	- 1.24	252
- 0.26	154	- 0.59	187	- 0.92	220	- 1.25	253
- 0.27	155	- 0.60	188	- 0.93	221	- 1.26	254
- 0.28	156	- 0.61	189	- 0.94	222	- 1.27	255
- 0.29	157	- 0.62	190	- 0.95	223		
- 0.30	158	- 0.63	191	- 0.96	224		
- 0.31	159	- 0.64	192	- 0.97	225		
- 0.32	160	- 0.65	193	- 0.98	226		
- 0.33	161	- 0.66	194	- 0.99	227		

APPENDIX B

LOOK UP TABLE FOR CURRENT RECALIBRATION

Difference	Offset	Difference	Offset	Difference	Offset	Difference	Offset
+ 0.000	0 or 127	+ 0.033	33	+ 0.066	66	+ 0.099	99
+ 0.001	1	+ 0.034	34	+ 0.067	67	+ 0.100	100
+ 0.002	2	+ 0.035	35	+ 0.068	68	+ 0.101	101
+ 0.003	3	+ 0.036	36	+ 0.069	69	+ 0.102	102
+ 0.004	4	+ 0.037	37	+ 0.070	70	+ 0.103	103
+ 0.005	5	+ 0.038	38	+ 0.071	71	+ 0.104	104
+ 0.006	6	+ 0.039	39	+ 0.072	72	+ 0.105	105
+ 0.007	7	+ 0.040	40	+ 0.073	73	+ 0.106	106
+ 0.008	8	+ 0.041	41	+ 0.074	74	+ 0.107	107
+ 0.009	9	+ 0.042	42	+ 0.075	75	+ 0.108	108
+ 0.010	10	+ 0.043	43	+ 0.076	76	+ 0.109	109
+ 0.011	11	+ 0.044	44	+ 0.077	77	+ 0.110	110
+ 0.012	12	+ 0.045	45	+ 0.078	78	+ 0.111	111
+ 0.013	13	+ 0.046	46	+ 0.079	79	+ 0.112	112
+ 0.014	14	+ 0.047	47	+ 0.080	80	+ 0.113	113
+ 0.015	15	+ 0.048	48	+ 0.081	81	+ 0.114	114
+ 0.016	16	+ 0.049	49	+ 0.082	82	+ 0.115	115
+ 0.017	17	+ 0.050	50	+ 0.083	83	+ 0.116	116
+ 0.018	18	+ 0.051	51	+ 0.084	84	+ 0.117	117
+ 0.019	19	+ 0.052	52	+ 0.085	85	+ 0.118	118
+ 0.020	20	+ 0.053	53	+ 0.086	86	+ 0.119	119
+ 0.021	21	+ 0.054	54	+ 0.087	87	+ 0.120	120
+ 0.022	22	+ 0.055	55	+ 0.088	88	+ 0.121	121
+ 0.023	23	+ 0.056	56	+ 0.089	89	+ 0.122	122
+ 0.024	24	+ 0.057	57	+ 0.090	90	+ 0.123	123
+ 0.025	25	+ 0.058	58	+ 0.091	91	+ 0.124	124
+ 0.026	26	+ 0.059	59	+ 0.092	92	+ 0.125	125
+ 0.027	27	+ 0.060	60	+ 0.093	93	+ 0.126	126
+ 0.028	28	+ 0.061	61	+ 0.094	94	+ 0.127	127
+ 0.029	29	+ 0.062	62	+ 0.095	95		
+ 0.030	30	+ 0.063	63	+ 0.096	96		
+ 0.031	31	+ 0.064	64	+ 0.097	97		
+ 0.032	32	+ 0.065	65	+ 0.098	98		

APPENDIX B (Continue)

LOOK UP TABLE FOR CURRENT RECALIBRATION (Continue)

Difference	Offset	Difference	Offset	Difference	Offset	Difference	Offset
- 0.01	129	- 0.34	162	- 0.67	195	- 1.00	228
- 0.02	130	- 0.35	163	- 0.68	196	- 1.01	229
- 0.03	131	- 0.36	164	- 0.69	197	- 1.02	230
- 0.04	132	- 0.37	165	- 0.70	198	- 1.03	231
- 0.05	133	- 0.38	166	- 0.71	199	- 1.04	232
- 0.06	134	- 0.39	167	- 0.72	200	- 1.05	233
- 0.07	135	- 0.40	168	- 0.73	201	- 1.06	234
- 0.08	136	- 0.41	169	- 0.74	202	- 1.07	235
- 0.09	137	- 0.42	170	- 0.75	203	- 1.08	236
- 0.10	138	- 0.43	171	- 0.76	204	- 1.09	237
- 0.11	139	- 0.44	172	- 0.77	205	- 1.10	238
- 0.12	140	- 0.45	173	- 0.78	206	- 1.11	239
- 0.13	141	- 0.46	174	- 0.79	207	- 1.12	240
- 0.14	142	- 0.47	175	- 0.80	208	- 1.13	241
- 0.15	143	- 0.48	176	- 0.81	209	- 1.14	242
- 0.16	144	- 0.49	177	- 0.82	210	- 1.15	243
- 0.17	145	- 0.50	178	- 0.83	211	- 1.16	244
- 0.18	146	- 0.51	179	- 0.84	212	- 1.17	245
- 0.19	147	- 0.52	180	- 0.85	213	- 1.18	246
- 0.20	148	- 0.53	181	- 0.86	214	- 1.19	247
- 0.21	149	- 0.54	182	- 0.87	215	- 1.20	248
- 0.22	150	- 0.55	183	- 0.88	216	- 1.21	249
- 0.23	151	- 0.56	184	- 0.89	217	- 1.22	250
- 0.24	152	- 0.57	185	- 0.90	218	- 1.23	251
- 0.25	153	- 0.58	186	- 0.91	219	- 1.24	252
- 0.26	154	- 0.59	187	- 0.92	220	- 1.25	253
- 0.27	155	- 0.60	188	- 0.93	221	- 1.26	254
- 0.28	156	- 0.61	189	- 0.94	222	- 1.27	255
- 0.29	157	- 0.62	190	- 0.95	223		
- 0.30	158	- 0.63	191	- 0.96	224		
- 0.31	159	- 0.64	192	- 0.97	225		
- 0.32	160	- 0.65	193	- 0.98	226		
- 0.33	161	- 0.66	194	- 0.99	227		

End

Appendix C

NDP4185/4303/4601 Command Set

{ }- command data, [ ] - return data, [OK] = "OK", [CR] = 0dh
???? = 30h, 30h, 30h, 30h - 39h, 39h, 39h, 39h (4 bytes data)
??? = 30h, 30h, 30h - 39h, 39h, 39h (3 bytes data)
?? = 30h, 30h – 39h, 39h (2 bytes data)
<address> 30h, 30h - 3fh, 3fh (2 bytes data).
BLUE – Input Command
RED – Return Data from Power Supply
PS = Power Supply

Command Code	Description
Input Command: SESS <address> <CR> Return Data from Power Supply: [OK] [CR]	Disable front panel keypad and make PS to Remote Mode
Input Command: ENDS <address> <CR> Return Data from Power Supply: [OK] [CR]	Enable front panel keypad and make PS to exit Remote Mode
Input Command: CCOM <address> <RS> {000-255} <CR> Return Data from Power Supply: [OK] [CR]	Change USB1.1/RS485 <RS> = 0 -> USB1.1 <RS> = 1 -> RS-485
Input Command: GCOM <address> <CR> Return Data from Power Supply: [RS] RS485 Address [??] [CR] [OK] [CR]	Get the RS-485 address
Input Command: GMAX <address> <CR> Return Data from Power Supply: Voltage [???] Current [???] [CR] [OK] [CR]	Get maximum voltage and current of PS
Input Command: GOVP <address> <CR> Return Data from Power Supply: Voltage [???] [CR] [OK] [CR]	Get Upper Voltage Limit of PS
Input Command: GETD <address> <CR> Return Data from Power Supply: Voltage [????] Current [????] [0] [CR][OK] [CR] Voltage [????] Current [????] [1] [CR][OK] [CR]	Get Voltage & Current reading from PS PS in CV mode PS in CC mode
Input Command: GETS <address> <CR> Return Data from Power Supply: Voltage [???] Current [???] [CR] [OK] [CR]	Get Voltage & Current Set Value from PS

Command Code	Description
Input Command: GETM <address> <CR> Return Data from Power Supply: Memory 1 Voltage [???] Current [???] [CR] Memory 2 Voltage [???] Current [???] [CR] . . . . Memory 9 Voltage [???] Current [???] [CR] [OK] [CR]	Get All Preset Memory Values from PS
Input Command: GETM <address> location {1-9} <CR> Return Data from Power Supply: Voltage [???] Current [???] [CR] [OK] [CR]	Get Memory from Specific Preset of PS
Input Command: GETP <address> <CR> Return Data from Power Supply: Program 00 Voltage [???] Current [???] Minute [??] Second [??] [CR] Program 01 Voltage [???] Current [???] Minute [??] Second [??] [CR] . . . . Program 19 Voltage [???] Current [???] Minute [??] Second [??] [CR] [OK] [CR]	Get all the Timed Program Memory of PS
Input Command: GETP <address> program {00-19} <CR> Return Data from Power Supply: Voltage [???] Current [???] Minute [??] Second [??] [CR] [OK] [CR]	Get Timed Program Memory from Specific Program of PS
Input Command: VOLT <address> voltage {000-XXX} <CR> Return Data from Power Supply: [OK] [CR]	Set Voltage Level XXX-Max. Output Rating Voltage = XX.X V Current = X.XX V
Input Command: CURR <address> current {000-XXX} <CR> Return Data from Power Supply: [OK] [CR]	Set Current Level
Input Command: SOVP <address> voltage {000-XXX} <CR> Return Data from Power Supply: [OK] [CR]	Set Upper Voltage Limit of PS
Input Command: SOUT <address> 1 <CR> Return Data from Power Supply: [OK] [CR]	Disable Output of PS
Input Command: SOUT <address> 0 <CR> Return Data from Power Supply: [OK] [CR]	Enable Output of PS

Command Code	Description
Input Command: PROM <address> location {1-9} Voltage {000-XXX} Current {000-XXX} <CR> Return Data from Power Supply: [OK] [CR]	Set Voltage and Current values of Preset Memory
Input Command: PROP <address> location {00-19} Voltage {000-XXX} Current {000-XXX} Minute {00-99} Second {00-59} <CR> Return Data from Power Supply: [OK] [CR]	Set Voltage, Current and Time period of Timed Program
Input Command: RUNM <address> location {1-9} <CR> Return Data from Power Supply: [OK] [CR]	Recall Preset Memory 1-9
Input Command: RUNP <address> times {000-999} <CR> Return Data from Power Supply: [OK] [CR]	Run Timed Program (000 = run infinite times)
Input Command: STOP <address> <CR> Return Data from Power Supply: [OK] [CR]	Stop Timed Program

APPENDIX D

OPTIONAL RS-232 to RS-485 Adapter (ATR-2485 User Manual)

INTRODUCTION

This Adapter is designed for connecting your PC with RS-232 communication port to HALF- DUPLEX RS-485 int erface programmable power supplies (or other equipment). Its transmission length can be up to 1000m.

FEATURES & BENEFITS

1. No driver software is needed
2. Can directly connected to male RS-232 communication port of your PC

CONTROL AND PIN ASSIGNMENT

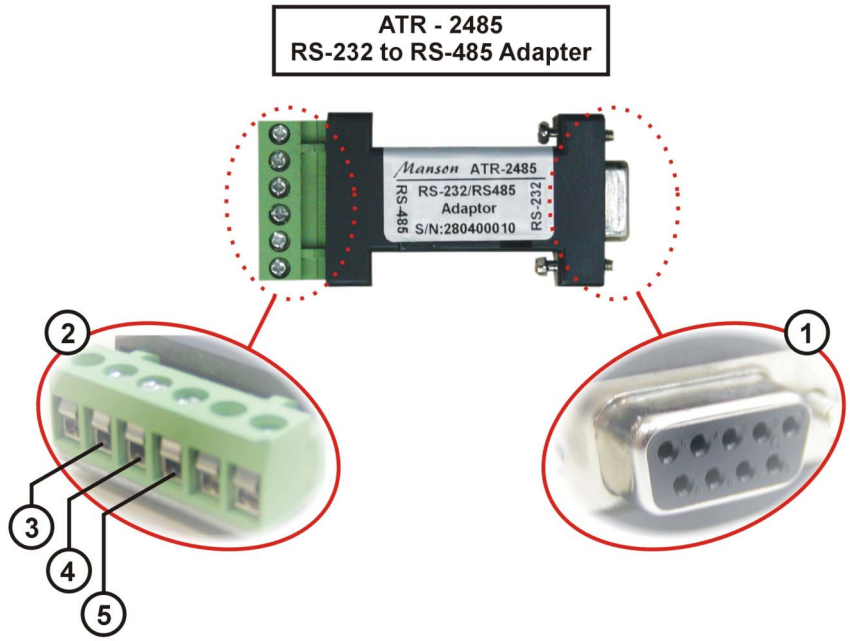


Fig.1

(1) RS-232 (Connect to the PC communication port)
(2) RS-485 (Connect to equipment with RS-485 interface)
There are 6 pins, only **A+**, **B-** and **GND** pin are useful.
(3) Pin **A+**
(4) Pin **B-**
(5) Pin **GND**

SPECIFICATIONS

RS-232 side of the adapter	DB-9 female connector
RS-485 side of the adaptor	3-pin connector - pin 1: RS-485 (+A) pin 2: RS-485 (-B) pin 3: GND
Connection Speed	9600bps
Transmission Length	Up to 1000 m
Dimension	33mm (W) x 17mm (H) x 87mm (D)
Weight	40 g

CONNECTION DIAGRAM

Connect the RS-232 side of ATR-2485 to the PC Communication port.

1. Single Power Supply Connection:

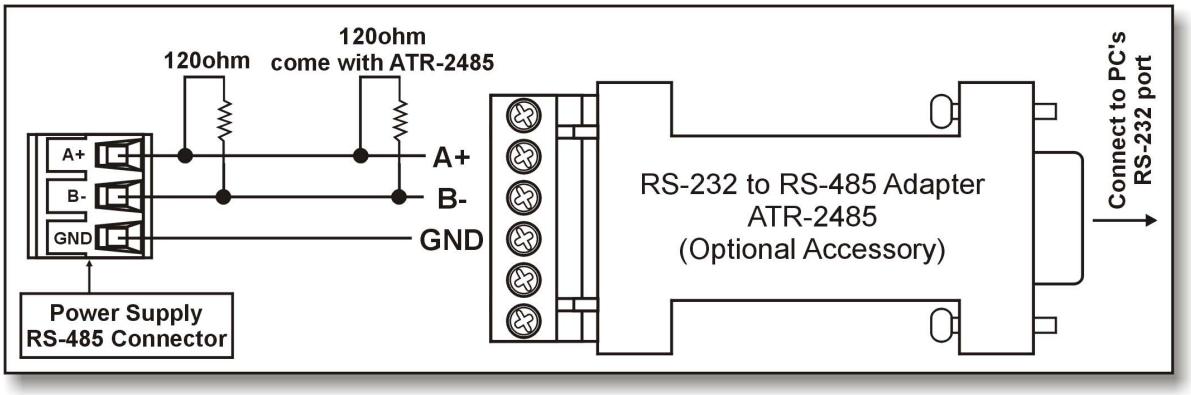


Fig.2

2. 2 or more power supplies connection:

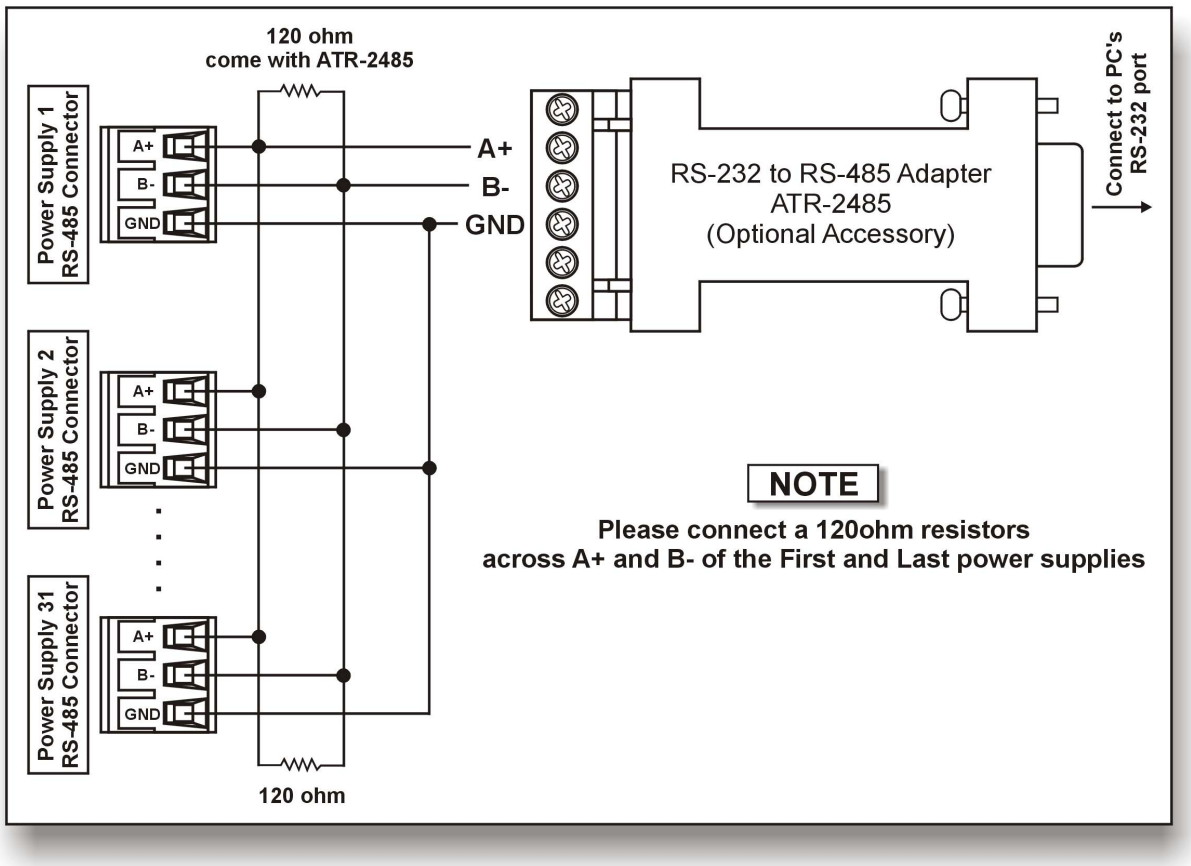


Fig.3

END